Amendments to the Claims

1. **(Previously presented)** A laser drilling apparatus comprising:

means for emitting a plurality of laser pulses;

means for deflecting said plurality of laser pulses at a part;

means for positioning said part for receiving said plurality of laser pulses;

computer means for controlling operation of said deflection means and for orienting said positioning means to drill a shaped hole in said part; and

means for providing diagnostic feedback to said computer means, wherein said diagnostic feedback measures an attribute of at least one of said laser pulses during the progress of said hole being drilled.

2. **(Original)** The laser drilling apparatus of claim 1 wherein said part is a metallic or ceramic coated metallic turbine airfoil.

3. **(Original)** The laser drilling apparatus of claim 1 wherein said means for emitting a plurality of laser pulses comprises a laser selected from the group consisting of CPA Ti:Sapphire, CPA Cr:LiSAF, CPA Yb:YAG, CPA Yb:YLF, CPA optical parametric amplifier systems, excimer lasers, Q-switched, solid state lasers, and mode-locked solid state lasers.

4. **(Original)** The apparatus of claim 1 wherein each of said plurality of laser pulses has a pulse duration between one hundred femtoseconds and ten picoseconds in duration.

5. **(Original)** The apparatus of claim 1 wherein each of said plurality of laser pulses is less than or equal to 100 nanoseconds.

6. **(Original)** The laser drilling apparatus of claim 1 wherein said plurality of laser pulses are emitted at a frequency of at least 1 kilohertz.

7. **(Original)** The laser drilling apparatus of claim 1 additionally comprising a shuttering means for alternatingly blocking and allowing passage of said plurality of laser pulses.

8. (**Original**) The laser drilling apparatus of claim 1 comprising a magnifying means for magnifying an intensity of at least one of said plurality of laser pulses and comprising a controlling means for adjusting an energy of at least one of said plurality of laser pulses.

9. (**Original**) The laser drilling apparatus of claim 1 comprising a waveplate/polarizer.

10. (**Original**) The laser drilling apparatus of claim 1 additionally comprising a means for focusing said plurality of laser pulses upon a drill plane.

11. (**Original**) The laser drilling apparatus of claim 10 wherein said focusing means comprises a focusing lens for focusing said plurality of laser pulses upon a drill plane.

12. (**Original**) The laser drilling apparatus of claim 11 wherein said focusing means is selected from the group consisting of a curved mirror, a holographic element, and a multiple lens telescope.

13. (**Original**) The laser drilling apparatus of claim 1 additionally comprising a beam shaping means for altering a beam intensity cross section of at least one of said plurality of laser pulses at a desired drill plane.

14. (**Original**) The laser drilling apparatus of claim 13 wherein said beam-shaping means is selected from the group consisting of 1/4 waveplates, 1/2 waveplates, and phase plates, group of phase plates, apertures, optical systems for beam shaping, and spatial light modulators.

15. (**Original**) The laser drilling apparatus of claim 1 additionally comprising a means for atmosphere control for controlling an atmosphere in which said part is located.

16. (**Original**) The laser drilling apparatus of claim 15 wherein said means for atmosphere control has an atmosphere selected from the group consisting of air, a near vacuum, and

primarily helium atmosphere.

17. **(Original)** The laser drilling apparatus of claim 1 wherein said deflection means comprises a scanning device selected from the group consisting of autometric scanners, piezoelectric driven tip-tilt mirrors, and voice coil driven tip-tilt mirrors.

18. **(Cancelled)**

19. **(Currently amended)** A laser drilling apparatus comprising:

a laser for emitting a plurality of laser pulses;

a beam delivery system for receiving said plurality of laser pulses comprising a scanning device for deflecting and emitting said plurality of laser pulses;

a part chamber for holding a part to be drilled, said part chamber comprising a part holder therein for positioning the part to receive said deflected plurality of laser pulses, said part chamber having an atmosphere at a pressure no greater than 20 mTorr;

a computer control for controlling movement of said part holder and operation of said scanning device to drill a hole in said part using said plurality of laser pulses; and

[a] diagnostic feedback [loop] for providing laser timing, power and alignment information to said computer control for at least one of said laser pulses during the progress of said hole being drilled.

20. **(Original)** The laser drilling apparatus of claim 19 wherein said laser is selected from the group consisting of CPA Ti:Sapphire, CPA Cr:LiSAF, CPA Yb:YAG, CPA Yb:YLF, CPA optical parametric amplifier systems, excimer lasers, Q-switched, and mode-locked solid state lasers.

21. **(Original)** The laser drilling apparatus of claim 19 wherein each of said plurality of laser pulses is between one hundred femtoseconds and ten picoseconds in duration.

22. **(Original)** The laser drilling apparatus of claim 19 wherein each of said plurality of laser

pulses is less than or equal to one hundred nanoseconds.

23. **(Original)** The laser drilling apparatus of claim 19 wherein each of said laser pulses is emitted at a frequency of at least 1 kilohertz.

24. **(Original)** The laser drilling apparatus of claim 19 wherein said laser is a chirped-pulse amplification (CPA) laser.

25. **(Original)** The laser drilling apparatus of claim 19 additionally comprising a shutter to alternatingly block and allow passage of said plurality of laser pulses.

26. **(Original)** The laser drilling apparatus of claim 19 comprising a waveplate/polarizer for magnifying an intensity of at least one of said laser pulses.

27. **(Original)** The laser drilling apparatus of claim 19 wherein said beam delivery system additionally comprises a focusing lens for focusing said plurality of laser pulses upon a drill plane.

28. **(Cancelled)**

29. **(Original)** The laser drilling apparatus of claim 19 wherein said part chamber is adapted to provide an atmosphere comprised primarily of helium.

30. **(Original)** The laser drilling apparatus of claim 19 additionally comprising at least one optical component through which said plurality of laser pulses travel selected from the group consisting of a 1/4 waveplate, a 1/2 waveplate, and a phase plate.

31. **(Previously presented)** A method for laser drilling holes in a turbine engine component comprising the steps of:

emitting a plurality of laser pulses from a laser;

deflecting said plurality of laser pulses off of a scanning device and emitting said plurality of laser pulses;

utilizing a part holder within a part chamber to position said turbine engine component to be drilled such that said turbine engine component receives said plurality of laser pulses deflected off of said scanning device;

maintaining said part chamber at a pressure no greater than 20 mTorr during said laser drilling;

controlling operation of said scanning device and movement and orientation of said part holder with a computer control; and

providing diagnostic feedback to adjust laser timing, power and alignment for at least one of said laser pulses during the progress of said hole being drilled.

32. (**Cancelled**)

33. (**Original**) The method of claim 31 wherein said emitting said plurality of laser pulses comprises laser emitting said plurality of laser pulses from said laser selected from the group consisting of CPA Ti:Sapphire, CPA Cr:LiSAF, CPA Yb:YAG, CPA optical parametric amplifier systems, and excimer lasers.

34. (**Original**) The method of claim 31 wherein said emitting said plurality of laser pulses comprises emitting each of said plurality of laser pulses having a duration of between one hundred femtoseconds and ten picoseconds.

35. (**Original**) The method of claim 31 wherein said emitting said plurality of laser pulses comprises emitting each of said plurality of laser pulses having a duration of less than or equal to one hundred nanoseconds.

36. (**Original**) The method of claim 31 wherein said emitting said plurality of laser pulses comprises emitting said laser pulses at a frequency of at least 1 kilohertz.

37. (**Original**) The method of claim 36 wherein said emitting said plurality of laser pulses comprises emitting said laser pulses at a frequency between 3 and 4 kilohertz.

38. (**Original**) The method of claim 31 comprising the additional step of operating a shutter to alternately block and allow passage of said plurality of laser pulses.

39. (**Original**) The method of claim 31 comprising the additional step of magnifying at least one of said plurality of laser pulses by utilizing a waveplate/polarizer.

40. (**Original**) The method of claim 31 comprising the additional step of focusing said plurality of laser pulses upon a drill plane using a focusing lens.

41. (**Cancelled**)

42. (**Previously presented**) The method of claim 31 wherein said controlling said part holder and said scanning device comprises the step of controlling said part holder and said scanning device in response to said diagnostic feedback to said computer control obtained from at least one diagnostic component selected from the group consisting of a CCD camera, a photo-diode, an autocorrelator, and a power meter.

43. (**Previously presented**) The laser drilling apparatus of claim 1 wherein said positioning means comprises a movable part holder to which the part is attached.

44. (**Previously presented**) The method of claim 31 further comprising sensing power of the laser pulses and transmitting said sensed power to said computer control and said computer control adjusting a variable beam splitter so as to emit a laser beam having desired properties.

45. (**Previously presented**) The method of claim 31 wherein said controlling step comprises executing a scan routine on said computer control to determine motion of the scanning device.